	A	B	C	D	E	F	G	H	I	J	K	L
1				General UCL Statistics for Data Sets with Non-Detects								
2	User Selected Options											
3			From File	Sheet1.wst								
4			Full Precision	OFF								
5			Confidence Coefficient	95%								
6	mber of Bootstrap Operations			2000								
7												
8												
9	Result_Value (1,3-dichlorobenzene_ug/kg)											
10												
11						General Statistics						
12						Number of Valid Data	10			Number of Detected Data		0
13						Number of Distinct Detected Data	0			Number of Non-Detect Data		10
14										Percent Non-Detects		100.00%
15												
16	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!											
17	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!											
18	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).											
19												
20	The data set for variable Result_Value (1,3-dichlorobenzene_ug/kg) was not processed!											
21												
22												
23												
24	Result_Value (hexachlorobenzene_ug/kg)											
25												
26						General Statistics						
27						Number of Valid Data	10			Number of Detected Data		6
28						Number of Distinct Detected Data	6			Number of Non-Detect Data		4
29										Percent Non-Detects		40.00%
30												
31				Raw Statistics						Log-transformed Statistics		
32						Minimum Detected	398			Minimum Detected		5.986
33						Maximum Detected	671			Maximum Detected		6.509
34						Mean of Detected	490.7			Mean of Detected		6.179
35						SD of Detected	103.4			SD of Detected		0.197
36						Minimum Non-Detect	699			Minimum Non-Detect		6.55
37						Maximum Non-Detect	765			Maximum Non-Detect		6.64
38												
39	Note: Data have multiple DLs - Use of KM Method is recommen									Number treated as Non-Detect		10
40	For all methods (except KM, DL/2, and ROS Methods),									Number treated as Detected		0
41	Observations < Largest ND are treated as NDs									Single DL Non-Detect Percentage		100.00%
42												
43	Warning: There are only 6 Detected Values in this data											
44	Note: It should be noted that even though bootstrap may be performed on this data set											
45	the resulting calculations may not be reliable enough to draw conclusions											
46												
47	It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.											
48												
49												
50						UCL Statistics						
51	Normal Distribution Test with Detected Values Only									Lognormal Distribution Test with Detected Values Only		
52						Shapiro Wilk Test Statistic	0.87			Shapiro Wilk Test Statistic		0.903
53						5% Shapiro Wilk Critical Value	0.788			5% Shapiro Wilk Critical Value		0.788
54	Data appear Normal at 5% Significance Level									Data appear Lognormal at 5% Significance Level		
55												
56	Assuming Normal Distribution									Assuming Lognormal Distribution		
57				DL/2 Substitution Method						DL/2 Substitution Method		
58						Mean	439.9			Mean		6.066
59						SD	101.5			SD		0.209
60						95% DL/2 (t) UCL	498.7			95% H-Stat (DL/2) UCL		502
61												
62				Maximum Likelihood Estimate(MLE) Method			N/A			Log ROS Method		
63				MLE method failed to converge properly						Mean in Log Scale		6.179
64										SD in Log Scale		0.147
65										Mean in Original Scale		487.4
66										SD in Original Scale		77.17
67										95% t UCL		532.1
68										95% Percentile Bootstrap UCL		530.9
69										95% BCA Bootstrap UCL		539
70										95% H-UCL		533.6
71												
72	Gamma Distribution Test with Detected Values Only									Data Distribution Test with Detected Values Only		
73						k star (bias corrected)	14.95			Data appear Normal at 5% Significance Level		

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	A	B	C	D	E	F	G	H	I	J	K	L
74					Theta Star	32.83						
75					nu star	179.4						
76												
77					A-D Test Statistic	0.401			Nonparametric Statistics			
78					5% A-D Critical Value	0.697				Kaplan-Meier (KM) Method		
79					K-S Test Statistic	0.697					Mean	490.7
80					5% K-S Critical Value	0.332					SD	94.36
81	Data appear Gamma Distributed at 5% Significance Level										SE of Mean	42.2
82											95% KM (t) UCL	568
83			Assuming Gamma Distribution								95% KM (z) UCL	560.1
84		Gamma ROS Statistics using Extrapolated Data									95% KM (jackknife) UCL	571.1
85					Minimum	398					95% KM (bootstrap t) UCL	742.1
86					Maximum	671					95% KM (BCA) UCL	557.9
87					Mean	496.7					95% KM (Percentile Bootstrap) UCL	560.2
88					Median	505.8					95% KM (Chebyshev) UCL	674.6
89					SD	77.44					97.5% KM (Chebyshev) UCL	754.2
90					k star	34.23					99% KM (Chebyshev) UCL	910.6
91					Theta star	14.51						
92					Nu star	684.7			Potential UCLs to Use			
93					AppChi2	624.9					95% KM (t) UCL	568
94		95% Gamma Approximate UCL (Use when n >= 40)				544.2					95% KM (Percentile Bootstrap) UCL	560.2
95			95% Adjusted Gamma UCL (Use when n < 40)			553						
96	Note: DL/2 is not a recommended method.											
97												
98	ote: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UC											
99	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006)											
100	For additional insight, the user may want to consult a statistician.											
101												
102												
103	Result_Value (mercury_mg/kg)											
104												
105					General Statistics							
106				Number of Valid Observations		10				Number of Distinct Observations		9
107												
108				Raw Statistics						Log-transformed Statistics		
109					Minimum	0.068					Minimum of Log Data	-2.688
110					Maximum	0.199					Maximum of Log Data	-1.614
111					Mean	0.116					Mean of log Data	-2.233
112					Geometric Mean	0.107					SD of log Data	0.42
113					Median	0.097						
114					SD	0.0499						
115					Std. Error of Mean	0.0158						
116					Coefficient of Variation	0.43						
117					Skewness	0.64						
118												
119												
120					Relevant UCL Statistics							
121				Normal Distribution Test						Lognormal Distribution Test		
122					Shapiro Wilk Test Statistic	0.851					Shapiro Wilk Test Statistic	0.862
123					Shapiro Wilk Critical Value	0.842					Shapiro Wilk Critical Value	0.842
124				Data appear Normal at 5% Significance Level						Data appear Lognormal at 5% Significance Level		
125												
126				Assuming Normal Distribution						Assuming Lognormal Distribution		
127					95% Student's-t UCL	0.145					95% H-UCL	0.157
128				95% UCLs (Adjusted for Skewness)							95% Chebyshev (MVUE) UCL	0.184
129					95% Adjusted-CLT UCL (Chen-1995)	0.146					97.5% Chebyshev (MVUE) UCL	0.213
130					95% Modified-t UCL (Johnson-1978)	0.146					99% Chebyshev (MVUE) UCL	0.271
131												
132				Gamma Distribution Test						Data Distribution		
133					k star (bias corrected)	4.514				Data appear Normal at 5% Significance Level		
134					Theta Star	0.0257						
135					MLE of Mean	0.116						
136					MLE of Standard Deviation	0.0547						
137					nu star	90.28						
138					Approximate Chi Square Value (.05)	69.37				Nonparametric Statistics		
139					Adjusted Level of Significance	0.0267					95% CLT UCL	0.142
140					Adjusted Chi Square Value	66.19					95% Jackknife UCL	0.145
141											95% Standard Bootstrap UCL	0.141
142					Anderson-Darling Test Statistic	0.677					95% Bootstrap-t UCL	0.15
143					Anderson-Darling 5% Critical Value	0.728					95% Hall's Bootstrap UCL	0.143
144					Kolmogorov-Smirnov Test Statistic	0.29					95% Percentile Bootstrap UCL	0.142
145					Kolmogorov-Smirnov 5% Critical Value	0.267					95% BCA Bootstrap UCL	0.145
146	Data follow Appr. Gamma Distribution at 5% Significance Leve										95% Chebyshev(Mean, Sd) UCL	0.185

	A	B	C	D	E	F	G	H	I	J	K	L
147											97.5% Chebyshev(Mean, Sd) UCL	0.215
148				Assuming Gamma Distribution							99% Chebyshev(Mean, Sd) UCL	0.273
149			95% Approximate Gamma UCL (Use when n >= 40)			0.151						
150			95% Adjusted Gamma UCL (Use when n < 40)			0.158						
151												
152				Potential UCL to Use							Use 95% Student's-t UCL	0.145
153												
154	ote: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UC											
155	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
156	and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.											
157												
158												
159	Result_Value (total dioxin/furan teq 1998 (avian) (u = 1/2)_ng/kg)											
160												
161				General Statistics								
162				Number of Valid Observations		10					Number of Distinct Observations	10
163												
164				Raw Statistics							Log-transformed Statistics	
165				Minimum		20.93					Minimum of Log Data	3.041
166				Maximum		35.23					Maximum of Log Data	3.562
167				Mean		29.65					Mean of log Data	3.372
168				Geometric Mean		29.15					SD of log Data	0.202
169				Median		32.19						
170				SD		5.474						
171				Std. Error of Mean		1.731						
172				Coefficient of Variation		0.185						
173				Skewness		-0.928						
174												
175				Relevant UCL Statistics								
176				Normal Distribution Test							Lognormal Distribution Test	
177				Shapiro Wilk Test Statistic		0.773					Shapiro Wilk Test Statistic	0.754
178				Shapiro Wilk Critical Value		0.842					Shapiro Wilk Critical Value	0.842
179				Data not Normal at 5% Significance Level							Data not Lognormal at 5% Significance Level	
180												
181				Assuming Normal Distribution							Assuming Lognormal Distribution	
182				95% Student's-t UCL		32.83					95% H-UCL	33.76
183				95% UCLs (Adjusted for Skewness)							95% Chebyshev (MVUE) UCL	37.96
184				95% Adjusted-CLT UCL (Chen-1995)		31.96					97.5% Chebyshev (MVUE) UCL	41.54
185				95% Modified-t UCL (Johnson-1978)		32.74					99% Chebyshev (MVUE) UCL	48.57
186												
187				Gamma Distribution Test							Data Distribution	
188				k star (bias corrected)		20.46					Data do not follow a Discernable Distribution (0.05)	
189				Theta Star		1.45						
190				MLE of Mean		29.65						
191				MLE of Standard Deviation		6.556						
192				nu star		409.2						
193				Approximate Chi Square Value (.05)		363.3					Nonparametric Statistics	
194				Adjusted Level of Significance		0.0267					95% CLT UCL	32.5
195				Adjusted Chi Square Value		355.7					95% Jackknife UCL	32.83
196											95% Standard Bootstrap UCL	32.4
197				Anderson-Darling Test Statistic		1.284					95% Bootstrap-t UCL	32.24
198				Anderson-Darling 5% Critical Value		0.725					95% Hall's Bootstrap UCL	31.81
199				Kolmogorov-Smirnov Test Statistic		0.362					95% Percentile Bootstrap UCL	32.18
200				Kolmogorov-Smirnov 5% Critical Value		0.266					95% BCA Bootstrap UCL	32.04
201				Data not Gamma Distributed at 5% Significance Level							95% Chebyshev(Mean, Sd) UCL	37.2
202											97.5% Chebyshev(Mean, Sd) UCL	40.46
203				Assuming Gamma Distribution							99% Chebyshev(Mean, Sd) UCL	46.88
204			95% Approximate Gamma UCL (Use when n >= 40)			33.4						
205			95% Adjusted Gamma UCL (Use when n < 40)			34.11						
206												
207				Potential UCL to Use							Use 95% Student's-t UCL	32.83
208											or 95% Modified-t UCL	32.74
209												
210	ote: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UC											
211	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
212	and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.											
213												
214	Note: For highly negative-skewed data, confidence limits											
215	(e.g., Chen, Johnson, Lognormal, and Gamma) may not be											
216	reliable. Chen's and Johnson's methods provide											
217	adjustments for positvely skewed data sets.											
218												
219												

	A	B	C	D	E	F	G	H	I	J	K	L
220	Result_Value (total pcb congener (u = 1/2)_ng/kg)											
221												
222					General Statistics							
223					Number of Valid Observations	10				Number of Distinct Observations		10
224												
225					Raw Statistics					Log-transformed Statistics		
226					Minimum	1259031				Minimum of Log Data		14.05
227					Maximum	4005387				Maximum of Log Data		15.2
228					Mean	2642386				Mean of log Data		14.73
229					Geometric Mean	2494159				SD of log Data		0.367
230					Median	2643630						
231					SD	911478						
232					Std. Error of Mean	288235						
233					Coefficient of Variation	0.345						
234					Skewness	0.237						
235												
236					Relevant UCL Statistics							
237					Normal Distribution Test					Lognormal Distribution Test		
238					Shapiro Wilk Test Statistic	0.951				Shapiro Wilk Test Statistic		0.957
239					Shapiro Wilk Critical Value	0.842				Shapiro Wilk Critical Value		0.842
240					Data appear Normal at 5% Significance Level					Data appear Lognormal at 5% Significance Level		
241												
242					Assuming Normal Distribution					Assuming Lognormal Distribution		
243					95% Student's-t UCL	3170753				95% H-UCL		3430297
244					95% UCLs (Adjusted for Skewness)					95% Chebyshev (MVUE) UCL		4005276
245					95% Adjusted-CLT UCL (Chen-1995)	3139548				97.5% Chebyshev (MVUE) UCL		4591913
246					95% Modified-t UCL (Johnson-1978)	3174349				99% Chebyshev (MVUE) UCL		5744248
247												
248					Gamma Distribution Test					Data Distribution		
249					k star (bias corrected)	6.244				Data appear Normal at 5% Significance Level		
250					Theta Star	423212						
251					MLE of Mean	2642386						
252					MLE of Standard Deviation	1057493						
253					nu star	124.9						
254					Approximate Chi Square Value (.05)	100.1				Nonparametric Statistics		
255					Adjusted Level of Significance	0.0267				95% CLT UCL		3116490
256					Adjusted Chi Square Value	96.21				95% Jackknife UCL		3170753
257										95% Standard Bootstrap UCL		3100302
258					Anderson-Darling Test Statistic	0.21				95% Bootstrap-t UCL		3254180
259					Anderson-Darling 5% Critical Value	0.726				95% Hall's Bootstrap UCL		3231763
260					Kolmogorov-Smirnov Test Statistic	0.138				95% Percentile Bootstrap UCL		3086839
261					Kolmogorov-Smirnov 5% Critical Value	0.267				95% BCA Bootstrap UCL		3111481
262					Data appear Gamma Distributed at 5% Significance Level					95% Chebyshev(Mean, Sd) UCL		3898771
263										97.5% Chebyshev(Mean, Sd) UCL		4442410
264					Assuming Gamma Distribution					99% Chebyshev(Mean, Sd) UCL		5510283
265					95% Approximate Gamma UCL (Use when n >= 40)	3297502						
266					95% Adjusted Gamma UCL (Use when n < 40)	3429638						
267												
268					Potential UCL to Use					Use 95% Student's-t UCL		3170753
269												
270	ote: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UC											
271	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
272	and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.											
273												
274												
275	Result_Value (total pcb congener teq 1998 (avian) (u = 1/2)_ng/kg)											
276												
277					General Statistics							
278					Number of Valid Observations	10				Number of Distinct Observations		10
279												
280					Raw Statistics					Log-transformed Statistics		
281					Minimum	197.1				Minimum of Log Data		5.284
282					Maximum	789.2				Maximum of Log Data		6.671
283					Mean	449.5				Mean of log Data		6.022
284					Geometric Mean	412.3				SD of log Data		0.448
285					Median	442.6						
286					SD	191.3						
287					Std. Error of Mean	60.48						
288					Coefficient of Variation	0.426						
289					Skewness	0.532						
290												
291					Relevant UCL Statistics							
292					Normal Distribution Test					Lognormal Distribution Test		

	A	B	C	D	E	F	G	H	I	J	K	L
293					Shapiro Wilk Test Statistic	0.922					Shapiro Wilk Test Statistic	0.934
294					Shapiro Wilk Critical Value	0.842					Shapiro Wilk Critical Value	0.842
295					**Data appear Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**	
296												
297					**Assuming Normal Distribution**						**Assuming Lognormal Distribution**	
298					95% Student's-t UCL	560.3					95% H-UCL	628.6
299					**95% UCLs (Adjusted for Skewness)**						95% Chebyshev (MVUE) UCL	733.8
300					95% Adjusted-CLT UCL (Chen-1995)	559.8					97.5% Chebyshev (MVUE) UCL	856.2
301					95% Modified-t UCL (Johnson-1978)	562					99% Chebyshev (MVUE) UCL	1097
302												
303					**Gamma Distribution Test**						**Data Distribution**	
304					k star (bias corrected)	4.236					**Data appear Normal at 5% Significance Level**	
305					Theta Star	106.1						
306					MLE of Mean	449.5						
307					MLE of Standard Deviation	218.4						
308					nu star	84.72						
309					Approximate Chi Square Value (.05)	64.51					**Nonparametric Statistics**	
310					Adjusted Level of Significance	0.0267					95% CLT UCL	548.9
311					Adjusted Chi Square Value	61.45					95% Jackknife UCL	560.3
312											95% Standard Bootstrap UCL	543.1
313					Anderson-Darling Test Statistic	0.375					95% Bootstrap-t UCL	579.7
314					Anderson-Darling 5% Critical Value	0.729					95% Hall's Bootstrap UCL	627.6
315					Kolmogorov-Smirnov Test Statistic	0.205					95% Percentile Bootstrap UCL	545.4
316					Kolmogorov-Smirnov 5% Critical Value	0.267					95% BCA Bootstrap UCL	547.1
317					**Data appear Gamma Distributed at 5% Significance Level**						95% Chebyshev(Mean, Sd) UCL	713.1
318											97.5% Chebyshev(Mean, Sd) UCL	827.2
319					**Assuming Gamma Distribution**						99% Chebyshev(Mean, Sd) UCL	1051
320					95% Approximate Gamma UCL (Use when n >= 40)	590.3						
321					95% Adjusted Gamma UCL (Use when n < 40)	619.7						
322												
323					**Potential UCL to Use**						Use 95% Student's-t UCL	560.3
324												
325	**ote: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UC**											
326	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
327	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
328												
329												
330	**Result_Value (total pcb congener teq 2005 (mammal) (u = 1/2)_ng/kg)**											
331												
332					**General Statistics**							
333					Number of Valid Observations	10					Number of Distinct Observations	10
334												
335					**Raw Statistics**						**Log-transformed Statistics**	
336					Minimum	12.88					Minimum of Log Data	2.556
337					Maximum	46.6					Maximum of Log Data	3.842
338					Mean	31.19					Mean of log Data	3.363
339					Geometric Mean	28.89					SD of log Data	0.436
340					Median	32.35						
341					SD	11.61						
342					Std. Error of Mean	3.671						
343					Coefficient of Variation	0.372						
344					Skewness	-0.311						
345												
346					**Relevant UCL Statistics**							
347					**Normal Distribution Test**						**Lognormal Distribution Test**	
348					Shapiro Wilk Test Statistic	0.931					Shapiro Wilk Test Statistic	0.889
349					Shapiro Wilk Critical Value	0.842					Shapiro Wilk Critical Value	0.842
350					**Data appear Normal at 5% Significance Level**						**Data appear Lognormal at 5% Significance Level**	
351												
352					**Assuming Normal Distribution**						**Assuming Lognormal Distribution**	
353					95% Student's-t UCL	37.92					95% H-UCL	43.34
354					**95% UCLs (Adjusted for Skewness)**						95% Chebyshev (MVUE) UCL	50.63
355					95% Adjusted-CLT UCL (Chen-1995)	36.84					97.5% Chebyshev (MVUE) UCL	58.93
356					95% Modified-t UCL (Johnson-1978)	37.86					99% Chebyshev (MVUE) UCL	75.24
357												
358					**Gamma Distribution Test**						**Data Distribution**	
359					k star (bias corrected)	4.749					**Data appear Normal at 5% Significance Level**	
360					Theta Star	6.568						
361					MLE of Mean	31.19						
362					MLE of Standard Deviation	14.31						
363					nu star	94.97						
364					Approximate Chi Square Value (.05)	73.5					**Nonparametric Statistics**	
365					Adjusted Level of Significance	0.0267					95% CLT UCL	37.23

	A	B	C	D	E	F	G	H	I	J	K	L
366					Adjusted Chi Square Value	70.22					95% Jackknife UCL	37.92
367											95% Standard Bootstrap UCL	37.04
368					Anderson-Darling Test Statistic	0.483					95% Bootstrap-t UCL	37.62
369					Anderson-Darling 5% Critical Value	0.728					95% Hall's Bootstrap UCL	36.67
370					Kolmogorov-Smirnov Test Statistic	0.265					95% Percentile Bootstrap UCL	36.8
371					Kolmogorov-Smirnov 5% Critical Value	0.267					95% BCA Bootstrap UCL	36.83
372			**Data appear Gamma Distributed at 5% Significance Level**								95% Chebyshev(Mean, Sd) UCL	47.19
373											97.5% Chebyshev(Mean, Sd) UCL	54.12
374			**Assuming Gamma Distribution**								99% Chebyshev(Mean, Sd) UCL	67.72
375		95% Approximate Gamma UCL (Use when n >= 40)				40.3						
376		95% Adjusted Gamma UCL (Use when n < 40)				42.18						
377												
378			**Potential UCL to Use**								Use 95% Student's-t UCL	37.92
379												
380	**ote: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UC**											
381	**These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)**											
382	**and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.**											
383												
384	**Note: For highly negative-skewed data, confidence limits**											
385	**(e.g., Chen, Johnson, Lognormal, and Gamma) may not be**											
386	**reliable. Chen's and Johnson's methods provide**											
387	**adjustments for positvely skewed data sets.**											
388												